Procedure-associated Module: SSI Protocols and Definitions

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Objectives

1. Describe the NHSN Procedure-associated Module.
2. Review key terms and definitions of infection and data fields used for reporting surgical site infection (SSI) events and denominator (procedure) data.
3. Define and interpret SSI rates and the Standardized Infection Ratio (SIR).
4. Describe the procedure import process in NHSN.

National Healthcare Safety Network (NHSN)

Patient Safety Component

- Device-Associated Module
- Procedure-Associated Module
- Medication-Associated Module
- MDRO and CDAD Module
- High-Risk Inpatient Influenza Vaccination Module

Procedure-associated Module Components

Procedure-associated Module

- Surgical Site Infections
- Post Procedure Pneumonia

NHSN Surveillance Methodology

- Active
- Patient-based
- Prospective
- Priority-directed
- Risk-adjusted, incidence rates

Epidemiology

- SSIs are the third most frequently reported HAI
- Account for 14-16% of all HAIs among hospitalized patients
- Remains a substantial cause of morbidity and mortality even with recent advances in prevention

SSI Denominator: Procedure Records

Procedures: Key Terms

The following Key Terms will be defined:

- NHSN Operative Procedure
- NHSN Inpatient & Outpatient
- Operating Room
- Implant
- Transplant

NHSN Operative Procedure

- An operative procedure …
  - Is performed on a patient who is an NHSN inpatient or an NHSN outpatient
  - Takes place during an operation where a surgeon makes a skin or mucous membrane incision (including laparoscopic approach) and primarily closes the incision before the patient leaves the operating room
  - Is represented by an NHSN operative procedure code

NHSN Operative Procedures

- Each NHSN operative procedure category consists of a group of ICD-9-CM codes

  Example: CBGB (CABG with chest and donor site incisions) = ICD-9 codes 36.10 – 36.14, 36.19

- When monitoring a specific NHSN operative procedure category, all the ICD-9 codes within that category that are done in your facility must be followed

NHSN Inpatient

- A patient whose date of admission to the healthcare facility and the date of discharge are different calendar days

NHSN Outpatient

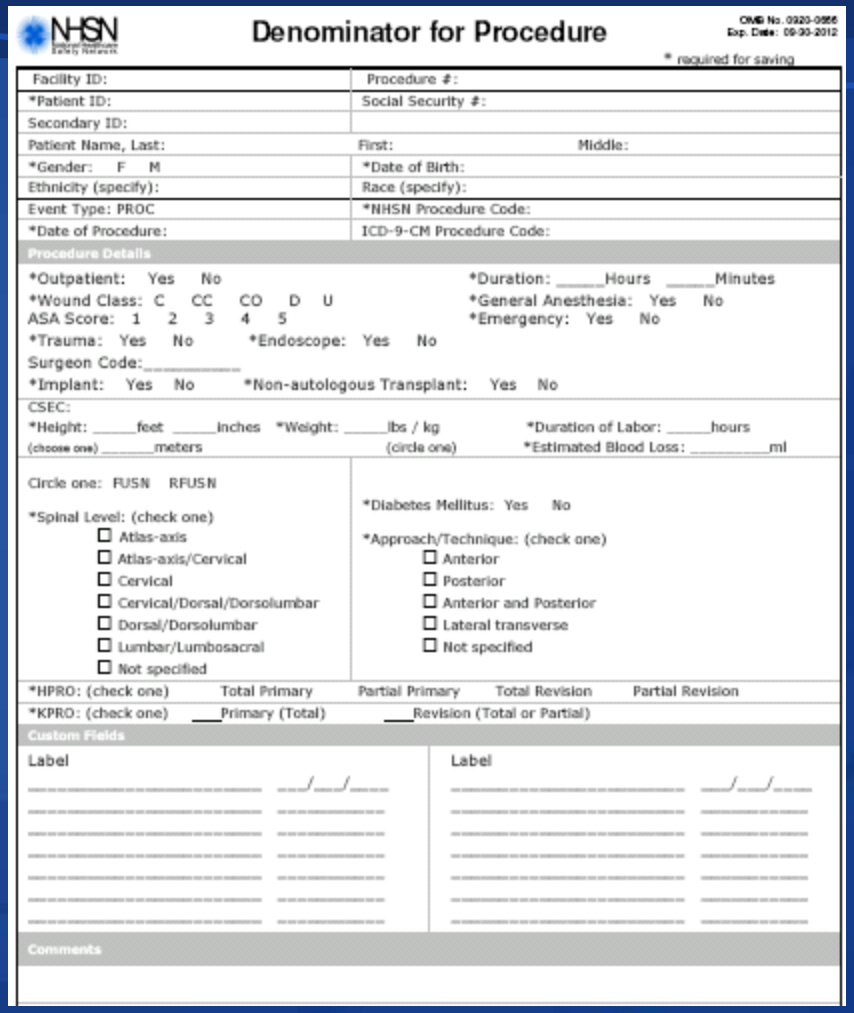
- A patient whose date of admission to the healthcare facility and date of discharge are the same calendar day.

Operating Room

- A patient care area that meets the American Institute of Architects (AIA) criteria for an operating room
- May include an operating room, c-section room, interventional radiology room, or cardiac cath lab

Collecting Denominator Data

- Complete a **Denominator for Procedure** form for each procedure that is selected for surveillance
  - Example: If you are monitoring KPRO, complete a Denominator for Procedure form for every KPRO performed during the month



NHSN

Denominator for Procedure

OMB No. 0920-0666
Exp. Date: 09-30-2012

* required for saving

Facility ID:	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	
Patient Name, Last:	First: Middle:
*Gender: F M	*Date of Birth:
Ethnicity (specify):	Race (specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Duration: _____Hours _____Minutes
*Wound Class: C CC CO D U
*General Anesthesia: Yes No
ASA Score: 1 2 3 4 5
*Emergency: Yes No
*Trauma: Yes No
*Endoscope: Yes No
Surgeon Code:_____
*Implant: Yes No
*Non-autologous Transplant: Yes No

CSEC:
*Height: _____feet _____inches (choose one) _____meters
*Weight: _____lbs / kg (circle one)
*Duration of Labor: _____hours
*Estimated Blood Loss: _____ml

Circle one: FUSN RFUSN

*Spinal Level: (check one)
- ☐ Atlas-axis
- ☐ Atlas-axis/Cervical
- ☐ Cervical
- ☐ Cervical/Dorsal/Dorsolumbar
- ☐ Dorsal/Dorsolumbar
- ☐ Lumbar/Lumbosacral
- ☐ Not specified

*Diabetes Mellitus: Yes No

*Approach/Technique: (check one)
- ☐ Anterior
- ☐ Posterior
- ☐ Anterior and Posterior
- ☐ Lateral transverse
- ☐ Not specified

*HPRO: (check one) Total Primary Partial Primary Total Revision Partial Revision

*KPRO: (check one) ___Primary (Total) ___Revision (Total or Partial)

Custom Fields

Label		Label	
_____	___/___/____	_____	___/___/____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Comments

Denominator Data

- Some operative procedures have more than one incision
  - Example: CBGB in which an incision to harvest a donor vessel is made that is separate from the primary incision
- Record these procedures only one time – there is no separate procedure code for the donor harvest site

Denominator Data

- If more than one NHSN operative procedure is performed during the same trip to the OR, a Denominator for Procedure record is reported for each operative procedure being monitored. Even if more than one NHSN operative procedure is done through the same incision (e.g., CARD and CBGC), a *Denominator for Procedure* record is reported for each. EXCEPTION: If a patient has both a CBGC and CBGB during the same trip to the OR, report only as a CBGB.

Denominator Data

- For bilateral operative procedures (e.g., KPRO), two separate Denominator for Procedure records are completed.

Duration

- Record the hours and minutes between the skin incision and skin closure
- Do not record anesthesia time
- If the patient goes to the OR more than once during the same admission and another procedure is performed through the same incision within 24 hours of the original incision, report the combined duration of operation for both procedures

Duration (cont'd.)

- EXAMPLE:
  - A patient has a CBGB lasting 4 hours. He returns to the OR six hours later to correct a bleeding vessel. The surgeon reopens the initial incision, makes the repairs, and recloses in 1.5 hours. Record the operative procedure as one CBGB and the duration of operation as 5 hour 30 minutes. If the wound class has changed, report the higher wound class. If the ASA class has changed, report the higher ASA class.

Duration (contd.)

- If more than one NHSN operative procedure is performed through the same incision during the same trip to the OR, then the *entire* time it took to complete all procedures (from incision to primary closure) is recorded on each Denominator for Procedure form.
- For Bilateral procedures, enter the time for each procedure separately or, alternatively, take the total time for both procedures and split it evenly between the two

Duration (contd.)

EXAMPLE:

If a patient has a COLO and a HYST procedure through the same incision during the same trip to the OR and both are being monitored for that month (i.e., in the reporting plan), then a COLO procedure record and a HYST procedure record must be completed. If the entire procedure took 2 hours and 45 minutes, then this duration is recorded on both the COLO and on the HYST record.

Wound Class

- Wound class is an assessment of the likelihood and degree of contamination of a surgical wound at the time of the operation. It cannot be pre-assigned. Assignment should be made by the surgeon or another person assisting on the case.
- Wounds are divided into four classes:
  - Clean
  - Clean-Contaminated
  - Contaminated
  - Dirty
- NHSN allows “unknown” to be reported although the procedure will not be included in the aggregate pool or your facility’s risk-adjusted rates.

Wound Class

- **Clean (I)**
  - Uninfected wound, no inflammation; respiratory, alimentary, genital, or uninfected urinary tracts not entered; primarily closed; closed drainage, if needed
- **Clean contaminated (II)**
  - Respiratory, alimentary, genital, or urinary tracts entered under controlled conditions and without unusual contamination; include operations on biliary tract, appendix, vagina, oropharynx

Wound Class

- **Contaminated (III)**
  - Open, fresh, accidental wounds; major breaks in sterile technique or gross spillage from GI tract; includes incisions into acute, nonpurulent inflamed tissues
- **Dirty / Infected (IV)**
  - Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera

General Anesthesia

- The administration of drugs or gases that enter the general circulation and affect the central nervous system to render the patient pain-free, amnesic, unconscious, and often paralyzed with relaxed muscles.

ASA* Class

1 = Normally healthy patient

2 = Patient with mild systemic disease

3 = Patient with severe systemic disease that is not incapacitating

4 = Patient with an incapacitating systemic disease that is a constant threat to life

5 = Moribund patient not expected to survive for 24 hours with or without operation

*American Society of Anesthesiologists

Endoscope

- If the entire operative procedure was performed using an endoscope/ laparoscope, select “Yes”
- Otherwise select “No”
- NOTE: Answering “Yes” means the operation was performed with the assistance of a scope through small incisions versus through a traditional, larger incisions (i.e., “open approach”).

Endoscope

- EXCEPTION:
  - For CBGB operations, if the donor vessel was harvested using a laparoscope, select “Yes”.

Implant

- A nonhuman-derived implantable foreign body (e.g., prosthetic heart valve, hip prosthesis) that is permanently placed in a patient during an NHSN operative procedure and is not routinely manipulated for diagnostic or therapeutic purposes
- Screws, wires, and mesh that are left in place are considered implants

Non-autologous Transplant

- Transplant: Human cells, tissues, organs, or cellular- or tissue-based products that are placed into a human recipient via grafting, infusion, or transfer. Examples include: heart valves, organs, ligaments, bone, blood vessels, skin, corneas, and bone marrow cells.
  - ***Autologous*** or “autograft” transplants are products that originate from the patient’s own body.
  - ***Non-autologous*** or “allograft” transplants are tissues or other products derived from another human body, either a donor cadaver or a live donor.

Transplant

REPORTING INSTRUCTIONS:

- Some products are a combination of human- and nonhuman-derived materials, such as demineralized human bone matrix with porcine gel carrier. When placed in a patient during an operative procedure, indicate “Yes” for both the Implant and Non-autologous Transplant fields.
- Some operative procedures involve placement of both autologous and non-autologous products. For these procedures, indicate “Yes” for Non-autologous Transplant field.

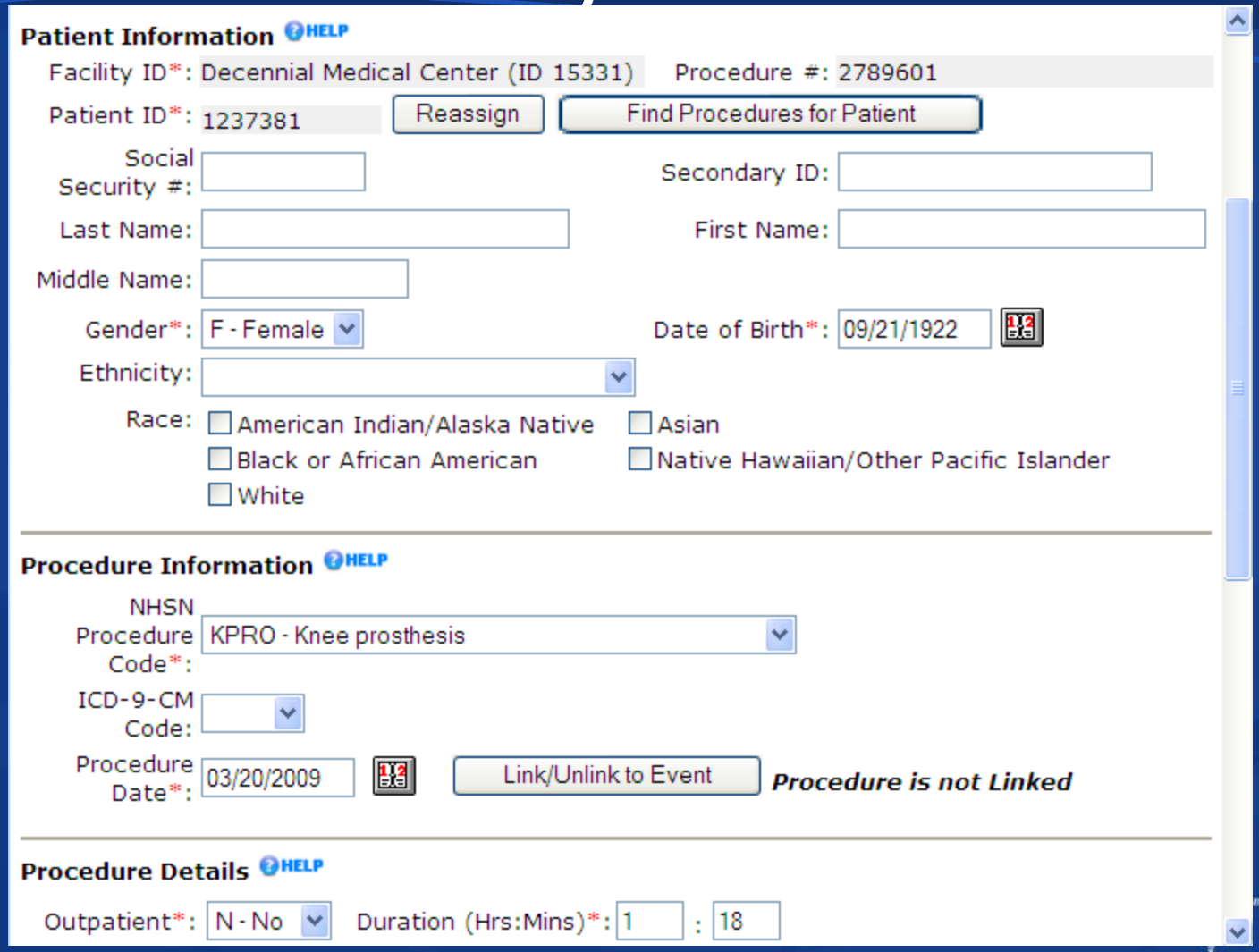
More …

- Emergency
  - Nonelective, unscheduled operative procedure
- Trauma
  - Operative procedure performed because of blunt or penetrating injury to patient
- Surgeon Code
  - Code of the surgeon who performed the principal operative procedure.
  - This is an optional field, but many facilities track surgeon codes so that surgeon-specific SSI rates and SIR can be reported back to the operating surgeons.

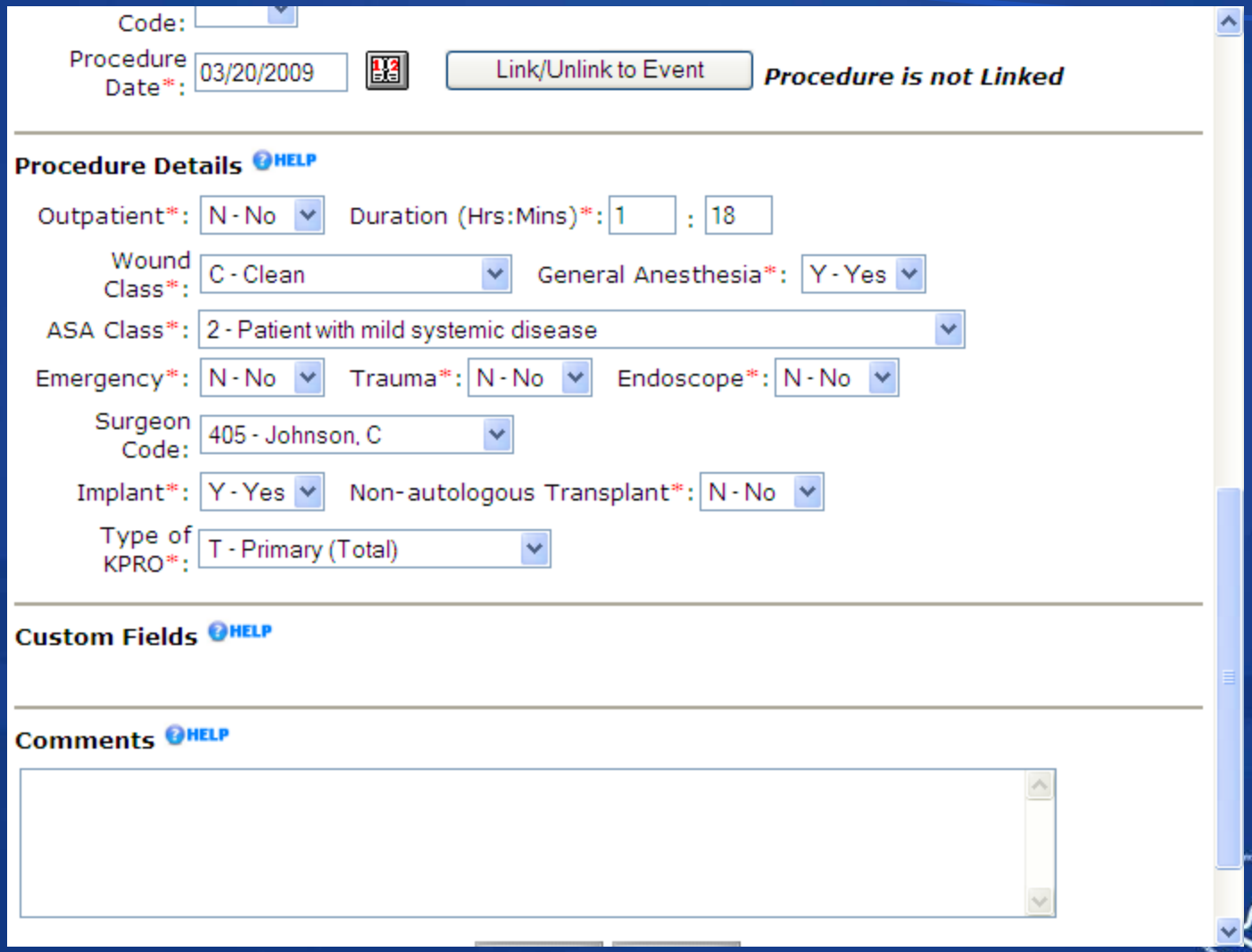
Additional Risk Factors

- The following procedure categories require additional data:
  - CSEC
  - FUSN/RFUSN
  - KPRO
  - HPRO

Completed Procedure Data Entry Screen



Completed Procedure Data Entry Screen- Cont'd.



SSI Surveillance

SSI Surveillance

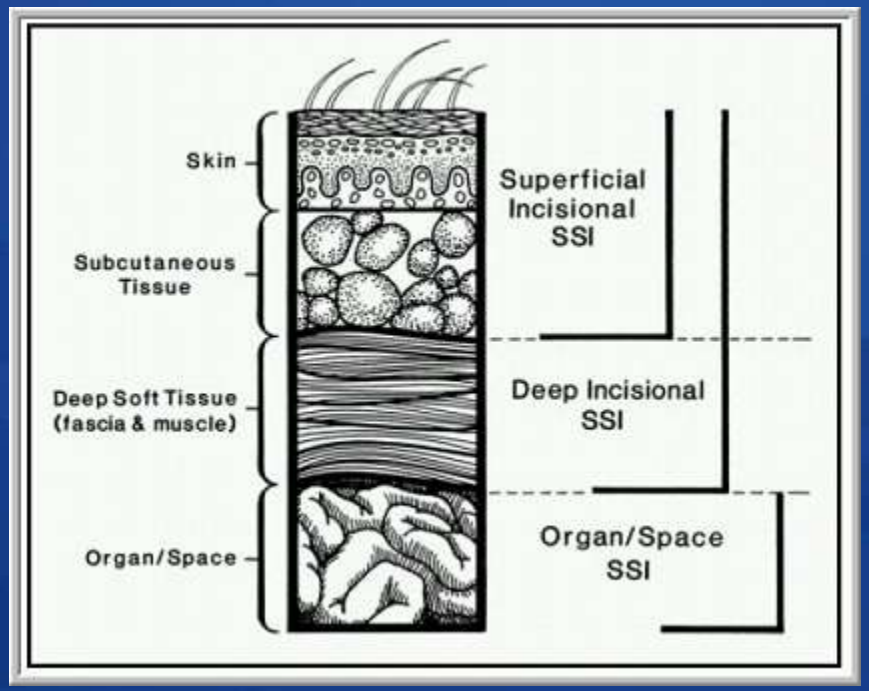
- Review of patient and laboratory records during patient admission
- Review of surgical patient readmissions
- Microbiology data from postoperative wound cultures.

SSI Postdischarge Surveillance

- Direct exam of patients' wounds during follow-up visits
- Review of medical records or clinic patients records
- Readmission to hospital
- Microbiology reports
- Surgeon surveys – phone or mail
- Patient surveys – less reliable

SSI Definitions

- There are three categories of SSI that are defined by CDC. Each SSI definition is related to the tissue depth of infection, as illustrated below.



Superficial Incisional SSI

Infection occurs within 30 days after the operative procedure

and

involves only skin and subcutaneous tissue of the incision

and

patient has at least one of the following:

- purulent drainage from the superficial incision.
- organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
- at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
- diagnosis of superficial incisional SSI by the surgeon or attending physician.

Superficial Incisional SSI

- Reporting Instructions
- Do not report a stitch abscess as an infection.
- Do not report a localized stab wound infection as SSI; it is either a skin or soft tissue infection, depending on its depth.
- An infected circumcision site in newborns is classified as CIRC; circumcision is not an NHSN operative procedure.
- An infected burn wound is classified as BURN and is not an NHSN protocol event.
- If the incisional SSI involves or extends into the fascial and muscle layers, report as deep incisional SSI.
- Report SSI that involves both superficial and deep incision sites as deep incisional SSI.

Deep Incisional SSI

Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure

and

involves deep soft tissues (e.g., fascial and muscle layers) of the incision

and

patient has at least one of the following:

- purulent drainage from the deep incision but not from the organ/space component of the surgical site
- deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured when the patient has at least one of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
- an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination
- diagnosis of a deep incisional SSI by a surgeon or attending physician.

Definitions

- Superficial Incisional Primary (SIP) – a superficial incisional SSI that is identified in the primary incision in the patient that has had an operation with one or more incisions (e.g., chest incision for CBGB)
- Deep Incisional Primary (DIP) – a deep incisional SSI that is identified in a primary incision in the patient that has had an operation with one or more incisions

Definitions

- Superficial Incisional Secondary (SIS) - a superficial incisional SSI that is identified in the secondary incision in the patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB)
- Deep Incisional Secondary (DIS) - a deep incisional SSI that is identified in the secondary incision in the patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB)

Organ /Space SSI

Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure

and

infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure

and

patient has at least one of the following:

- purulent drainage from a drain that is placed through a stab wound into the organ/space
- organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
- an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
- diagnosis of an organ/space SSI by a surgeon or attending physician.

Organ/Space SSI

- Specific sites are assigned to organ/space SSI to further identify the location of the infection

- Example: Report appendectomy with subsequent subdiaphragmatic abscess as an organ/space SSI at the intraabdominal specific site (SSI-IAB)

Specific Sites of an Organ/Space SSI

Table 2. Specific sites of an organ/space SSI. Criteria for these sites can be found in the NHSN Help Messages (must be logged in to NHSN) orChapter 17.[8]

Code	Site	Code	Site
BONE	Osteomyelitis	LUNG	Other infections of the respiratory tract
BRST	Breast abscess or mastitis	MED	Mediastinitis
CARD	Myocarditis or pericarditis	MEN	Meningitis or ventriculitis
DISC	Disc space	ORAL	Oral cavity (mouth, tongue, or gums)
EAR	Ear, mastoid	OREP	Other infections of the male or female reproductive tract
EMET	Endometritis	OUTI	Other infections of the urinary tract
ENDO	Endocarditis	SA	Spinal abscess without meningitis
EYE	Eye, other than conjunctivitis	SINU	Sinusitis
GIT	GI tract	UR	Upper respiratory tract
IAB	Intraabdominal, not specified else-where	VASC	Arterial or venous infection
IC	Intracranial, brain abscess or dura	VCUF	Vaginal cuff
JNT	Joint or bursa		

Organ/Space SSI

- Reporting Instructions
  - Report mediastinitis following cardiac surgery that is accompanied by osteomyelitis as SSI-MED rather than SSI-BONE.
  - If meningitis (MEN) and brain abscess are present together, report the infection as IC.
  - Report CSF shunt infection as SSI-MEN. If the infection occurs after one year or because of manipulation/access, it is considered CNS-MEN which is not an NHSN protocol event.
  - Report spinal abscess with meningitis as SSI-MEN following spinal surgery.
  - Episiotomy is not considered an operative procedure in NHSN.

SSI Numerator Data

- Use Surgical Site Infection (SSI) form for each SSI that is identified during the month
- Indicate the specific site of the SSI
  - SIP
  - DIP
  - SIS
  - DIS
  - Organ/Space

Example of Completed SSI Form

NHSN National Healthcare Safety Network

Surgical Site Infection (SSI)

Page 1 of 3

OMB No. 0920-0666
Exp. Date: 03-31-2011

*required for saving **required for completion Facility ID: 40000	Event #:
*Patient ID: 000-00-12345	Social Security #:
Secondary ID:	
Patient Name, Last: Greene	First: Geneva Middle: Susan
*Gender: (F) M	*Date of Birth: 05/21/1961
Ethnicity (Specify):	Race (Specify):
*Event Type: SSI	*Date of Event: 07/23/2008
*Date of Procedure: 06/16/2008	*NHSN Procedure Code: HPRO
ICD-9-CM Procedure Code:	*Outpatient: Yes (No) *MDRO Infection: Yes (No)
*Date Admitted to Facility: 06/16/2008	Location: ORTHO

Event Details

*Specific Event:

- ☐ Superficial Incisional Primary (SIP)
- ☐ Deep Incisional Primary (DIP)
- ☐ Superficial Incisional Secondary (SIS)
- ☐ Deep Incisional Secondary (DIS)
- ☒ Organ/Space (specify site): _____

*Specify Criteria Used (check all that apply):

Signs & Symptoms

- ☐ Purulent drainage or material
- ☒ Pain or tenderness
- ☐ Localized swelling
- ☐ Redness
- ☐ Heat
- ☐ Fever
- ☐ Incision deliberately opened by surgeon
- ☐ Wound spontaneously dehisces
- ☐ Abscess
- ☐ Hypothermia
- ☐ Apnea
- ☐ Bradycardia
- ☐ Lethargy
- ☐ Cough
- ☐ Nausea
- ☐ Vomiting
- ☐ Dysuria
- ☐ Other evidence of infection found on direct exam, during surgery, or by diagnostic tests‡
- ☐ Other signs & symptoms‡

Laboratory

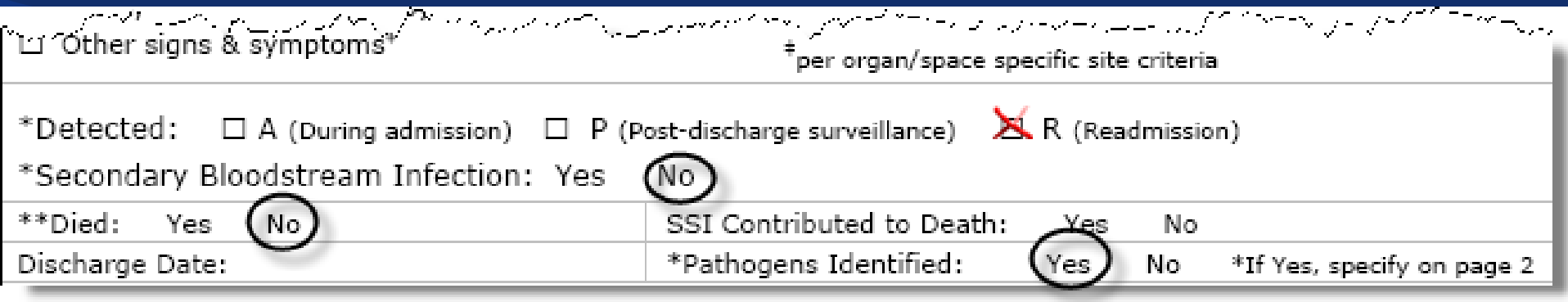
- ☒ Positive culture
- ☐ Not cultured
- ☐ Positive blood culture
- ☐ Blood culture not done or no organisms detected in blood
- ☐ Positive Gram stain when culture is negative or not done
- ☐ Other positive laboratory tests‡
- ☐ Radiographic evidence of infection

Clinical Diagnosis

- ☐ Physician diagnosis of this event type
- ☐ Physician institutes appropriate antimicrobial therapy‡

‡per organ/space specific site criteria

Detected


☐ Other signs & symptoms*

#per organ/space specific site criteria

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☒ R (Readmission)

*Secondary Bloodstream Infection: Yes No

**Died: Yes No | SSI Contributed to Death: Yes No

Discharge Date: | *Pathogens Identified: Yes No *If Yes, specify on page 2

A - if SSI was identified before the patient was discharged from the facility following the operation

P - if SSI was identified during post-discharge surveillance. Include as P those SSI identified by another facility

R - if SSI was identified due to patient readmission to the facility where the operation was done.

Pathogen Data

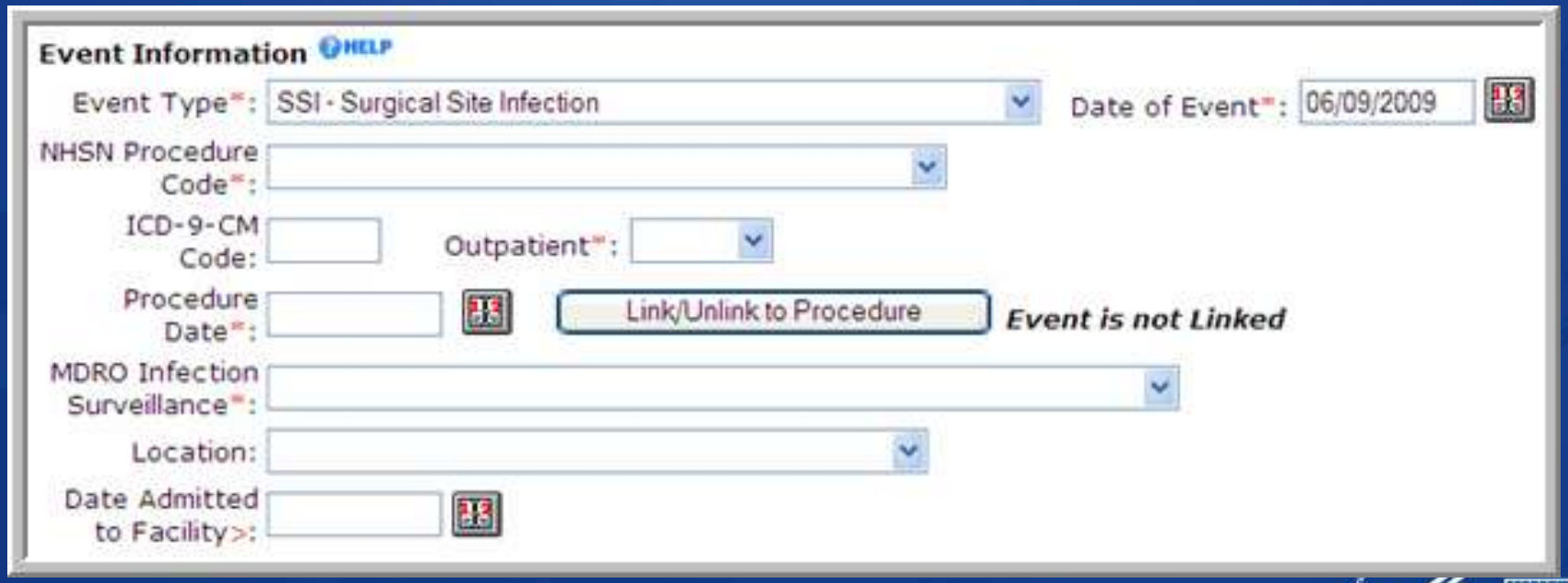
- List up to 3 pathogens for each SSI identified (in rank order of importance)
- For each pathogen, complete information about antimicrobial susceptibilities
- Only certain bug/drug combinations are required, but up to 20 drugs can be listed with susceptibilities

Linking

- All risk factors for SSI are collected on the Procedure record, not the SSI record.
- In order to bring the SSI and the risk factors together, the two records must be “linked” in NHSN.
- Procedure records must already be entered/imported
- Events not linked will not be included in SSI rates
- If necessary, use the Principle Operative Procedure Selection List

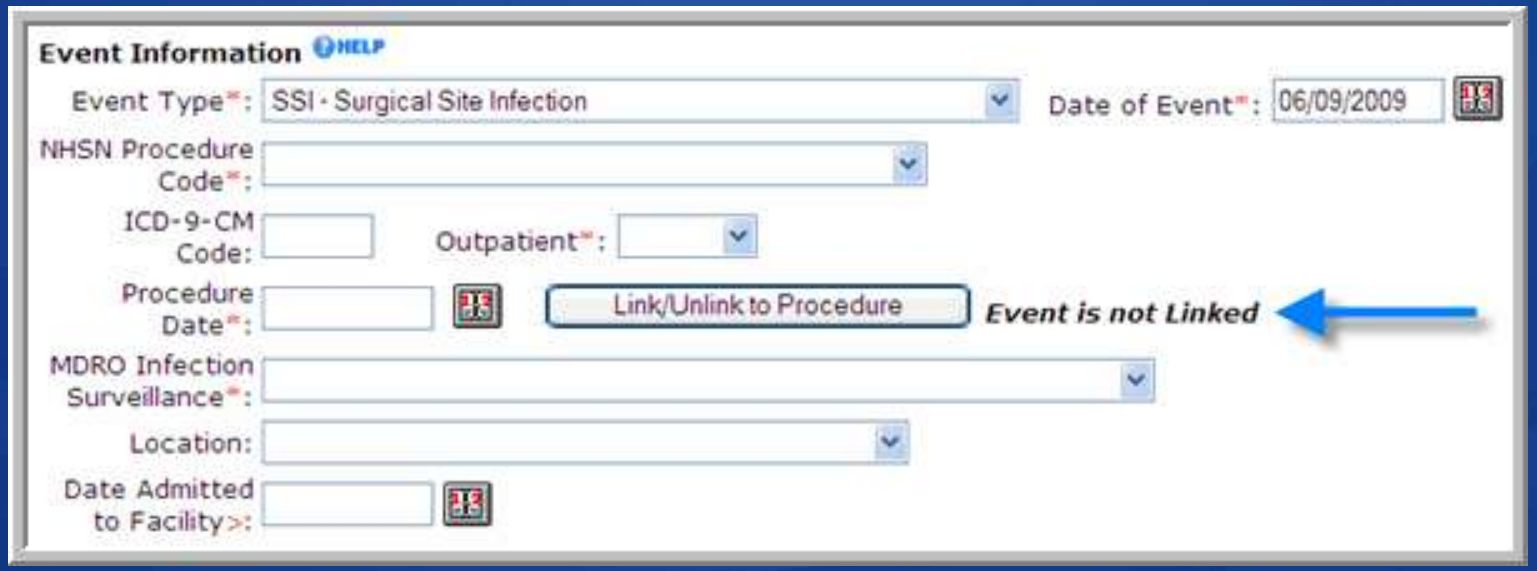
Linking

- The actual linking process takes place in the NHSN application when entering an SSI event.



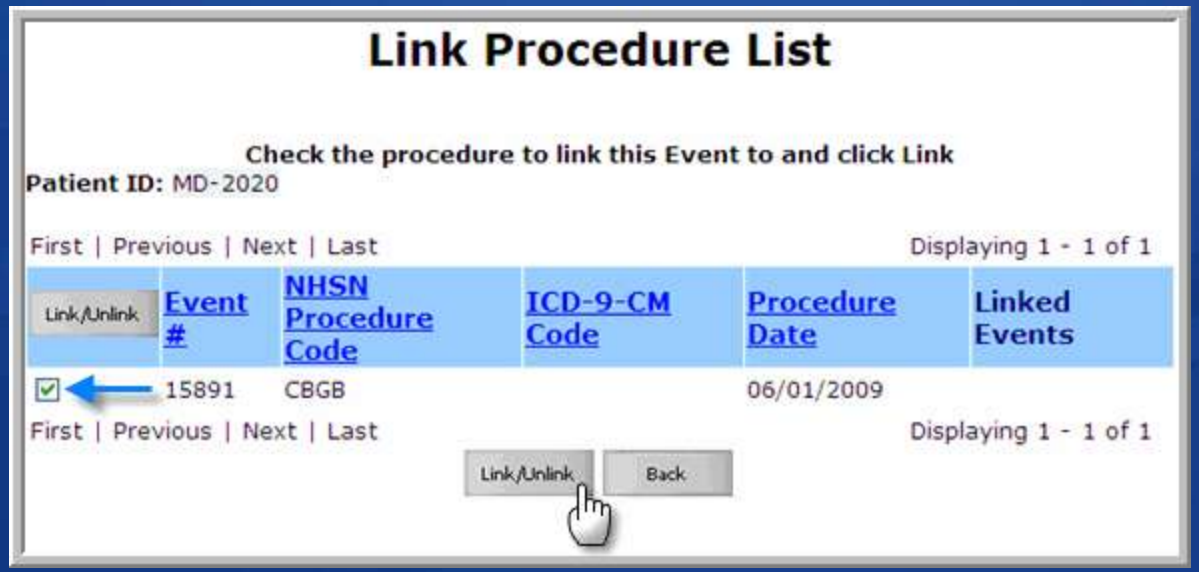
Linking

- When SSI is selected from the Event Type drop-down menu, the “Link/Unlink to Procedure” button appears



Linking

- A screen will appear listing the operative procedures entered for that patient.
- Check the box next to the operative procedure to which you want to link the SSI. Then, click the “Link/Unlink” button.



Linking

- The Event (SSI) screen will reappear with the procedure information filled in.

What if the patient had >1 procedure?

- If a patient has several NHSN operations prior to an SSI, report the operation that was performed most closely in time prior to the infection date, unless there is evidence that the infection is associated with a different operation.

What if the patient had >1 procedure?

- If more than one NHSN operative procedure was done through a single incision, during the same trip to the OR, and the patient develops an SSI:
  - First, try to determine the procedure that is thought to be associated with the infection.
  - If it's not clear, use the NHSN Principal Operative Procedure Selection List in Table 2 of the SSI Chapter.

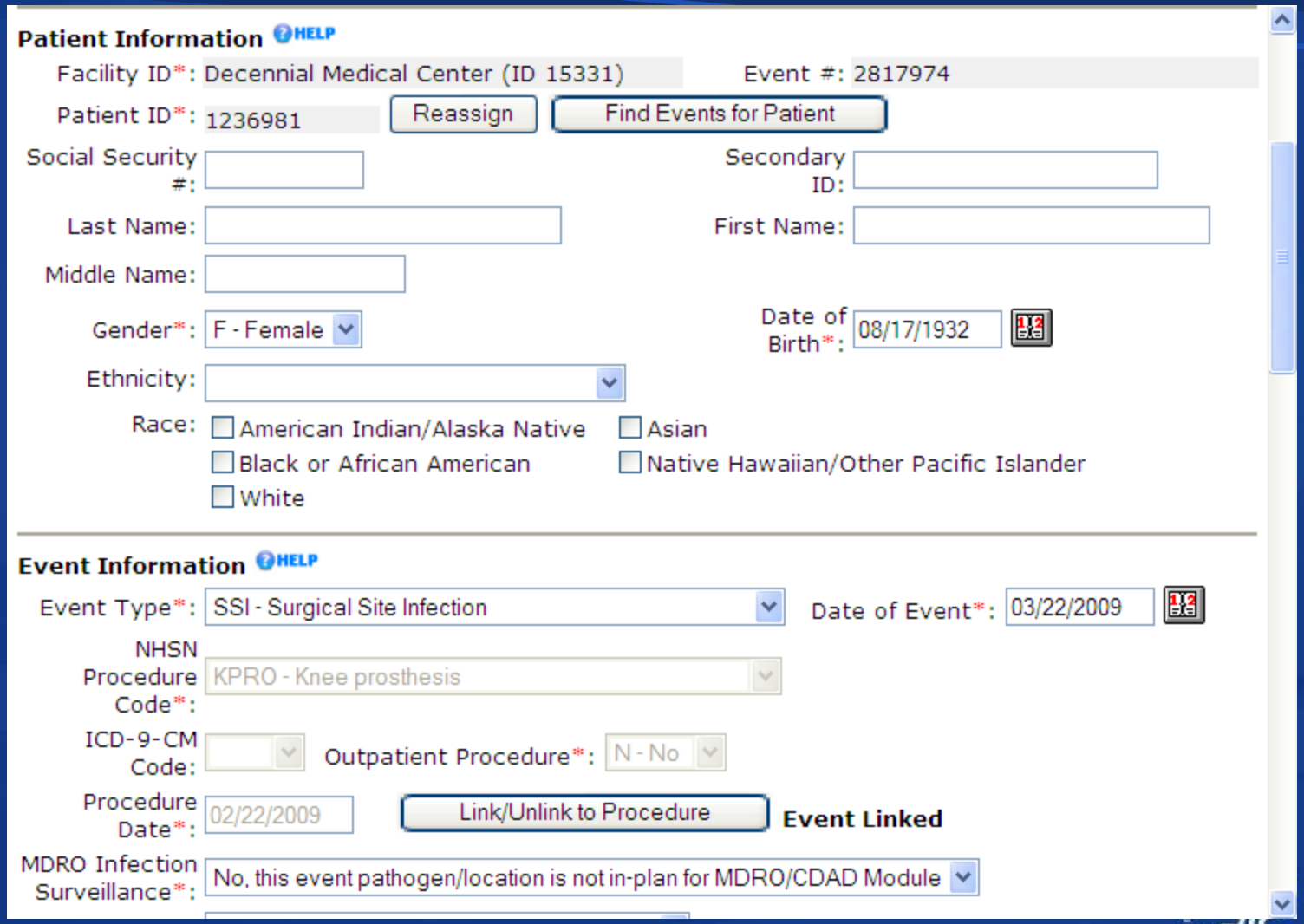
Principle Operative Procedure Selection List

Table 3. NHSN Principal Operative Procedure Selection Lists

The following lists are derived from Table 1, NHSN Operative Procedure Categories. The operative procedures with the highest risk of surgical site infection are listed before those with a lower risk.

Priority	Code	Abdominal Operations
1	SB	Small bowel surgery
2	KTP	Kidney transplant
3	LTP	Liver transplant
4	BILI	Bile duct, liver or pancreatic surgery
5	REC	Rectal surgery
6	COLO	Colon surgery
7	GAST	Gastric surgery
8	CSEC	Cesarean section
9	SPLE	Spleen surgery
10	APPY	Appendix surgery
11	HYST	Abdominal hysterectomy
12	VHYST	Vaginal Hysterectomy
13	OVRY	Ovarian surgery
[illegible]	[illegible]	Herni[illegible]aphy

Example: Completed SSI Screen



Patient Information HELP

Facility ID*: Decennial Medical Center (ID 15331) Event #: 2817974

Patient ID*: 1236981 [Reassign] [Find Events for Patient]

Social Security #: Secondary ID:

Last Name: First Name:

Middle Name:

Gender*: F - Female Date of Birth*: 08/17/1932

Ethnicity:

Race: ☐ American Indian/Alaska Native ☐ Asian
☐ Black or African American ☐ Native Hawaiian/Other Pacific Islander
☐ White

Event Information HELP

Event Type*: SSI - Surgical Site Infection Date of Event*: 03/22/2009

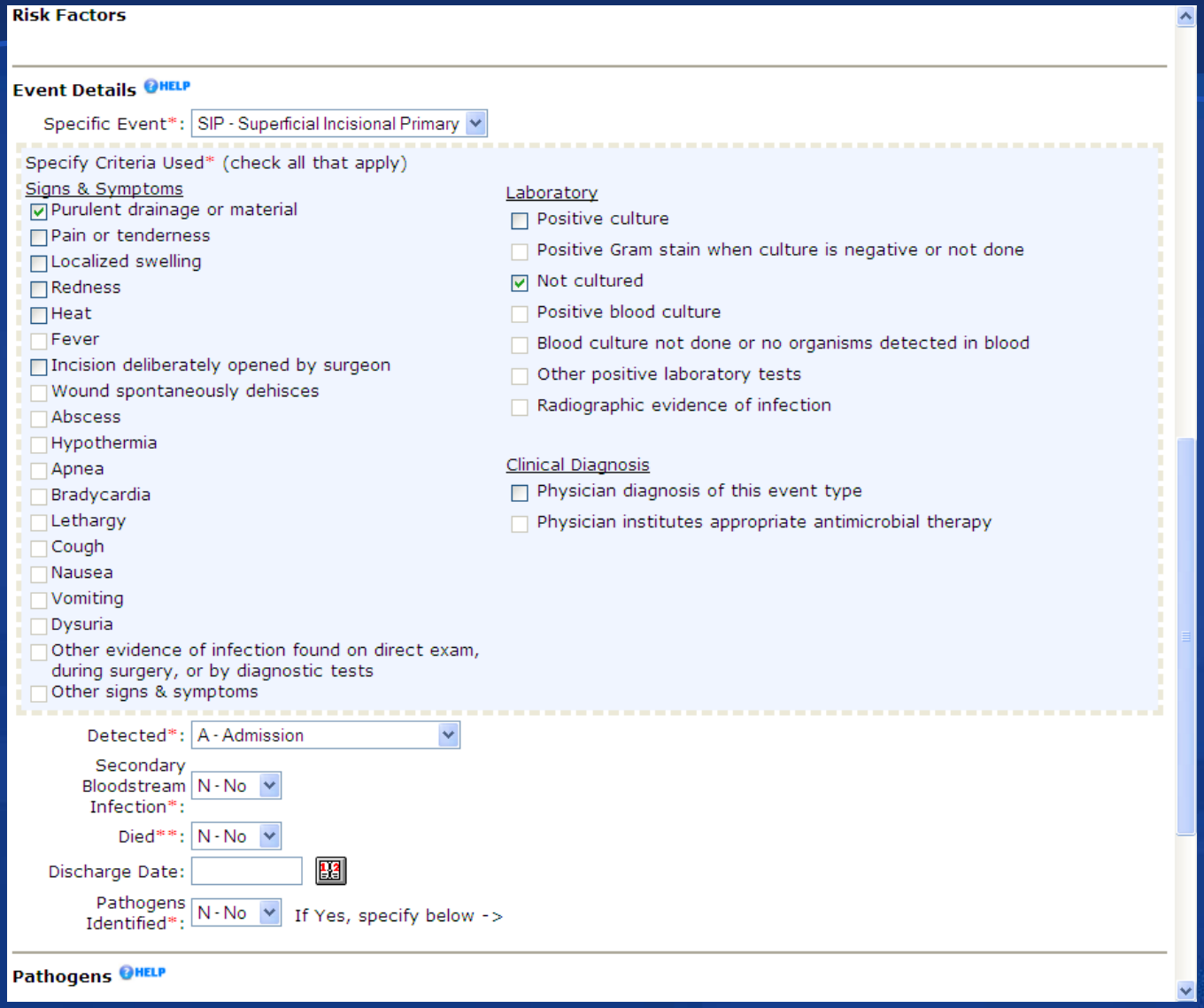
NHSN Procedure Code*: KPRO - Knee prosthesis

ICD-9-CM Code: Outpatient Procedure*: N - No

Procedure Date*: 02/22/2009 [Link/Unlink to Procedure] **Event Linked**

MDRO Infection Surveillance*: No, this event pathogen/location is not in-plan for MDRO/CDAD Module

Example: Completed SSI Screen



Risk Factors

Event Details HELP

Specific Event*: SIP - Superficial Incisional Primary

Specify Criteria Used* (check all that apply)

Signs & Symptoms

- [x] Purulent drainage or material
- [ ] Pain or tenderness
- [ ] Localized swelling
- [ ] Redness
- [ ] Heat
- [ ] Fever
- [ ] Incision deliberately opened by surgeon
- [ ] Wound spontaneously dehisces
- [ ] Abscess
- [ ] Hypothermia
- [ ] Apnea
- [ ] Bradycardia
- [ ] Lethargy
- [ ] Cough
- [ ] Nausea
- [ ] Vomiting
- [ ] Dysuria
- [ ] Other evidence of infection found on direct exam, during surgery, or by diagnostic tests
- [ ] Other signs & symptoms

Laboratory

- [ ] Positive culture
- [ ] Positive Gram stain when culture is negative or not done
- [x] Not cultured
- [ ] Positive blood culture
- [ ] Blood culture not done or no organisms detected in blood
- [ ] Other positive laboratory tests
- [ ] Radiographic evidence of infection

Clinical Diagnosis

- [ ] Physician diagnosis of this event type
- [ ] Physician institutes appropriate antimicrobial therapy

Detected*: A - Admission

Secondary Bloodstream Infection*: N - No

Died**: N - No

Discharge Date:

Pathogens Identified*: N - No If Yes, specify below ->

Pathogens HELP

Case Studies

Case Study #1

- A patient had bilateral knee prostheses (KPRO) during a single trip to the OR. Documentation:
  - Left KPRO incision at 0823 and closed at 0950
  - Right KPRO incision at 1003 and closed at 1131

Which statement is true?

A. One procedure should be reported with a duration of 2 hrs 51 min.

B. Two separate procedures, each with a duration of 2 hrs 51 min.

C. Two separate procedures –L KPRO with a duration of 1 hr 27 min and R KPRO with a duration of 1 hr 28 min

Case Study #2

- 45 year-old male patient
- Colon resection (COLO) performed on 6/18
- 6/22:
  - patient's abdominal wound has purulent drainage and slight erythema and induration
  - Wound swabs sent to lab for culture
  - Patient started on antibiotics
- 6/25:
  - wound culture grew *Enterobacter* spp. and *E. coli*

Case Study #2

- **Is this an SSI?**
- **If yes, what type?**

Case #3

- Patient is admitted to the hospital on 04/12 for elective surgery and active MRSA screening test is positive.
- On the same day, patient undergoes small bowel resection (SB).
- Postoperative course is unremarkable patient discharged on 4/16.
- On 4/29, patient is readmitted with a red, angry wound that is opened to the fascial level by the surgeon and is cultured.
- 4/30 culture positive for MRSA.

Case #3

Is this infection considered healthcare-associated?

Case #4

Which of the following does not meet the criteria for superficial incisional SSI if identified within 30 days after the procedure?

A. Physician documents “superficial wound infection”
B. Purulent drainage noted from upper aspect of incision
C. Physician documents “cellulitis”
D. MRSA grows from an aseptically obtained swab of the superficial incision

Case #5

- John Doe has a total knee replacement (KPRO) performed on 03/17/2008 at Hospital A.
- Discharged from Hospital A on 3/19/2008.
- Admitted to Hospital B on 3/25/2008 with purulent drainage from the superficial incision
- Further investigation concludes this is a superficial incisional SSI.

Which hospital reports this SSI?

What if the SSI was identified 60 days after the procedure?

SSI Rates and SIRs

SSI Rate

$$\text{SSI Rate*} = \frac{\text{\# SSI in patients during specified time}}{\text{\# operations during specified time}} \times 100$$

* Stratify by:
  - Type of NHSN operative procedure
  - NHSN Basic Risk Index

NHSN Basic Risk Index

- For each patient that has a specific NHSN procedure, assign a risk index based on the following:

Operation > duration cut point	1 point
Wound class III or IV	1 point
ASA score ≥ 3	1 point

Example of Assigning Risk Index Categories

Elements	Pt #1	Pt #2	Pt #3
Operation > duration cut point	Y	N	Y
Wound class	IV	I	II
ASA score	4	1	1
NHSN Risk Index category	3	0	1

Surgical Patient Component SSI Rates by Operation & Risk Index

Table 22. Pooled means and key percentiles of the distribution of SSI rates* by operative procedure and risk index categories, PA module, 2006 through 2008

Procedure code	Operative procedure description	Duration cutpoint, minutes	Risk index category	No. of hospitals†		No. of procedures	No. of SSI	Pooled mean	Percentiles				
									10%	25%	50% (median)	75%	90%
Inpatient procedures													
AAA	Abdominal aortic aneurysm repair	217	0, 1	41	(18)	1465	31	2.12					
AAA	Abdominal aortic aneurysm repair	217	2, 3	39	(6)	480	31	6.46					
AMP	Limb amputation	81	0, 1	15	(8)	560	7	1.25					
AMP	Limb amputation	81	2, 3	16	(8)	854	26	3.04					
APPY	Appendix surgery	81	0, 1	31	(22)	5211	60	1.15	0.00	0.00	0.60	1.23	2.76
APPY	Appendix surgery	81	2, 3	27	(9)	663	23	3.47					
AVSD	AV shunt for dialysis	112	0, 1, 2, 3	16	(8)	868	11	1.27					
BILI	Bile duct, liver or pancreatic surgery	321	0, 1	14	(7)	595	48	8.07					
BILI	Bile duct, liver or pancreatic surgery	321	2, 3	11	(4)	293	40	13.65					
BRST	Breast surgery	196	0	22	(9)	1478	14	0.95					
BRST	Breast surgery	196	1	21	(11)	1422	42	2.95					
BRST	Breast surgery	196	2, 3	15	(5)	236	15	6.36					
CARD	Cardiac surgery	306	0, 1	150	(124)	21,555	238	1.10	0.00	0.00	0.49	1.64	2.60
CARD	Cardiac surgery	306	2, 3	145	(83)	7130	131	1.84	0.00	0.00	1.24	3.25	4.71
CBGB	Coronary bypass with chest and donor incision	301	0	135	(4)	1738	6	0.35					

800 Edwards et al.

NHSN Report, Am J Infect Control 2009;37:783-805

Sample SSI Rate Table

Procedure Code	Risk Category	Performed in Outpatient Setting?	SSI Count	Procedure Count	SSI Rate	NHSN SSI Pooled Mean	Proportion p-value	Proportion Percentile
HPRO	0	N	5	102	4.90	0.67	0.0007	100
HPRO	1	N	4	212	1.89	1.44	0.3999	71
HPRO	2,3	N	2	59	3.39	2.40	0.4729	71
KPRO	0	N	2	157	1.27	0.58	0.2314	86
KPRO	1	N	5	165	3.03	0.99	0.0121	93
KPRO	2,3	N	4	62	6.45	1.60	0.0178	97

Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805

Data contained in this report were last generated on March 18, 2010 at 8:13 AM.

- During this time period, there were 62 KPRO procedures performed with a risk category of 2 ,3
- Of those 62 procedures, 4 SSIs were identified, yielding a rate of 6.45 per 100 procedures

Sample SSI Rate Table

Procedure Code	Risk Category	Performed in Outpatient Setting?	SSI Count	Procedure Count	SSI Rate	NHSN SSI Pooled Mean	Proportion p-value	Proportion Percentile
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KPRO	2,3	N	4	62	6.45	1.60	0.0178	97

Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805

Data contained in this report were last generated on March 18, 2010 at 8:13 AM.

- This rate can be compared to the NHSN pooled mean rate of 1.60. The p-value indicates that the difference between these two rates is statistically significant.
- This facility's SSI rate is at the 97th percentile, which means that 97% of facilities reporting SSIs following KPRO procedures in that risk category had a rate at or below this one.

Standardized Infection Ratio (SIR)

Ratio of

Observed (O) rate to Expected (E) rate

- or equivalently -

Observed # events to Expected # events

Example of Calculating SIR: Hospital

SIR = O/E

To calculate E, multiply the number of operations in a procedure-risk category performed by the hospital times the corresponding standard population's rate and divide by 100 and sum across the procedure-risk categories.

Interpreting the SIR

- If O = E, no difference
- If O > E, more SSI compared to standard
- If O < E, fewer SSI than standard
  - Be sure that case-finding has been adequate
- NOTE: The 95% Confidence Interval is only calculated if infCount > 1

Sample SIR Table

Procedure Code	Performed in Outpatient Setting?	O infCount	E Number Expected	Procedure Count	SIR	SIR p-value	95% Confidence Interval
HPRO	N	11	5.1522	373	2.14	0.0167	1.064, 3.82
HYST	N	0	2.018	129	0.00	0.1329	
KPRO	N	11	3.5361	384	3.11	0.0011	1.551, 5.566

- During this time period, there was a total of 384 KPROs performed in this facility.
- There were 11 SSIs reported (observed [O]), and, based on the NHSN pooled mean, 3.54 SSIs were expected (E).
- The SIR of 3.11 indicates that 3 times as many SSIs occurred than were expected.
- The p-value and the 95% confidence interval both indicate that the number of observed SSIs significantly exceeds the number expected.

Exclusions

- Some procedure records may be excluded from the SIR calculation if:
  - CDC has not calculated the pooled mean for that procedure (this includes outpatient procedures)
  - One or more data elements used to calculate the risk index is missing

SIR Exclusions

National Healthcare Safety Network

Procedures Performed But Not Included in SIR

As of: November 3, 2009 at 3:05 PM

Date Range: All SSI_RATESPROC_RISK

orgID=10018

orgID	procCode	outpatient	summaryYr	proccount
10018	CARD	N	2006	1
10018	CARD	N	2007	3
10018	CBGB	N	2006	2
10018	CBGB	N	2007	16

Source of aggregate data: NHSN Report, Am J Infect Control 2008;36:609-26

Data contained in this report were last generated on November 3, 2009 at 8:37 AM.

Importing

Importing & NHSN

- Import procedures and surgeons into NHSN using a comma delimited ASCII file created by the facility.
- CLABSI data, SSI data, and associated denominators can be imported using the Clinical Document Architecture (CDA) function; files created by your infection control software vendor.

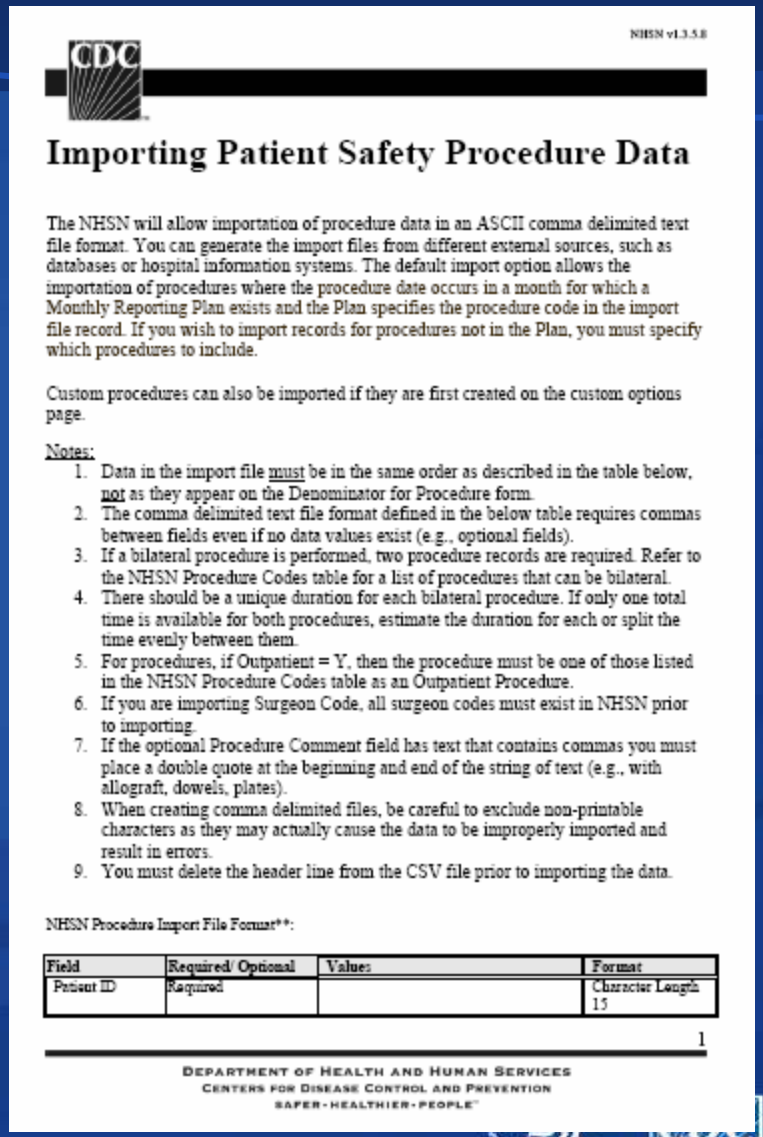
http://www.cdc.gov/nhsn/CDA_eSurveillance.html

Importing Procedure Data

- NHSN will allow importation of procedure data in an ASCII comma delimited text file format.
- You can generate the import file from different external sources, such as databases or hospital information systems.
- Will need assistance of OR and/or IT staff.
- Custom procedures can also be imported if they are first created on the custom options page.

Importing Procedure Data

- Procedure data that are imported must follow the NHSN file specifications, available at: http://www.cdc.gov/nhsn/PDFs/ImportingProcedureData_current.pdf
- Be sure to pay special attention to the notes!



NHSN v1.3.5.8

CDC

Importing Patient Safety Procedure Data

The NHSN will allow importation of procedure data in an ASCII comma delimited text file format. You can generate the import files from different external sources, such as databases or hospital information systems. The default import option allows the importation of procedures where the procedure date occurs in a month for which a Monthly Reporting Plan exists and the Plan specifies the procedure code in the import file record. If you wish to import records for procedures not in the Plan, you must specify which procedures to include.

Custom procedures can also be imported if they are first created on the custom options page.

Notes:

1. Data in the import file must be in the same order as described in the table below, not as they appear on the Denominator for Procedure form.
2. The comma delimited text file format defined in the below table requires commas between fields even if no data values exist (e.g., optional fields).
3. If a bilateral procedure is performed, two procedure records are required. Refer to the NHSN Procedure Codes table for a list of procedures that can be bilateral.
4. There should be a unique duration for each bilateral procedure. If only one total time is available for both procedures, estimate the duration for each or split the time evenly between them.
5. For procedures, if Outpatient = Y, then the procedure must be one of those listed in the NHSN Procedure Codes table as an Outpatient Procedure.
6. If you are importing Surgeon Code, all surgeon codes must exist in NHSN prior to importing.
7. If the optional Procedure Comment field has text that contains commas you must place a double quote at the beginning and end of the string of text (e.g., with allograft, dowels, plates).
8. When creating comma delimited files, be careful to exclude non-printable characters as they may actually cause the data to be improperly imported and result in errors.
9. You must delete the header line from the CSV file prior to importing the data.

NHSN Procedure Import File Format**:

Field	Required/ Optional	Values	Format
Patient ID	Required		Character Length 15

1

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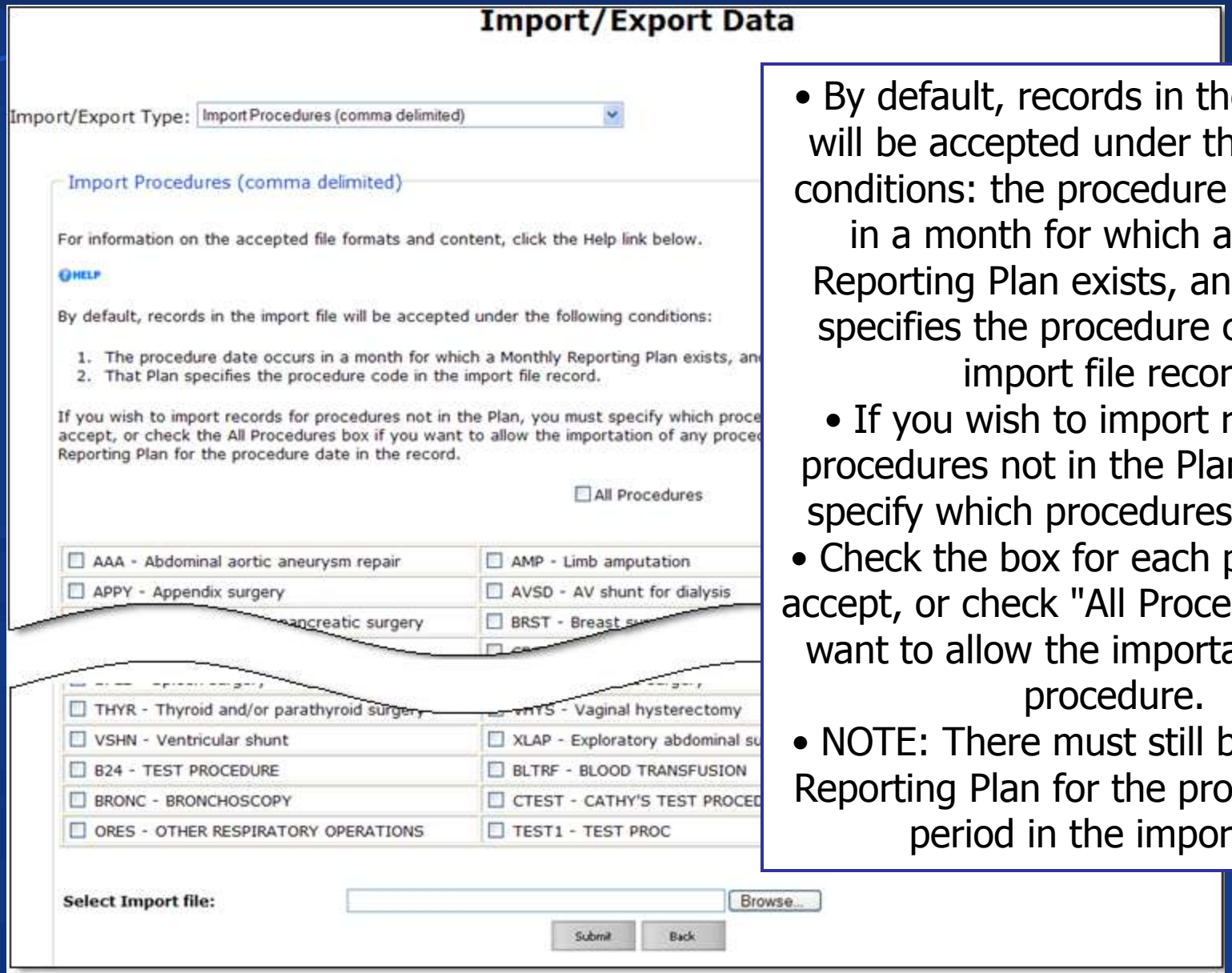
Importing Procedure Data

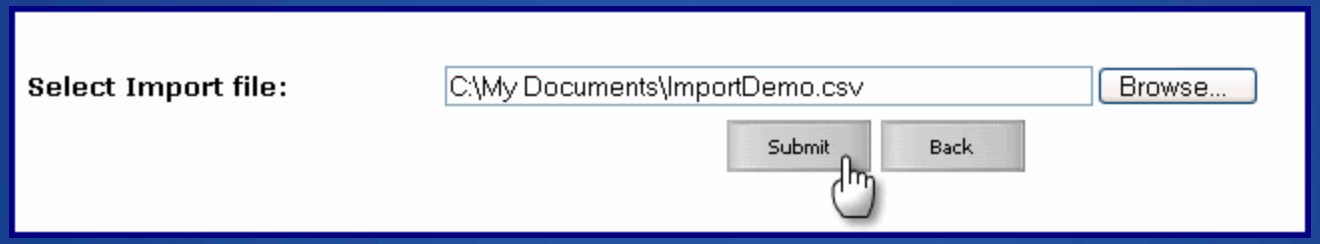
Importing Procedure Data



- By default, records in the import file will be accepted under the following conditions: the procedure date occurs in a month for which a Monthly Reporting Plan exists, and that Plan specifies the procedure code in the import file record.
- If you wish to import records for procedures not in the Plan, you must specify which procedures to include.
- Check the box for each procedure to accept, or check "All Procedures" if you want to allow the importation of any procedure.
- NOTE: There must still be a Monthly Reporting Plan for the procedure date period in the import file.

Importing Procedure Data

- Click “Browse” to search for and select the file to import. Once the file has been selected, click “Submit.”



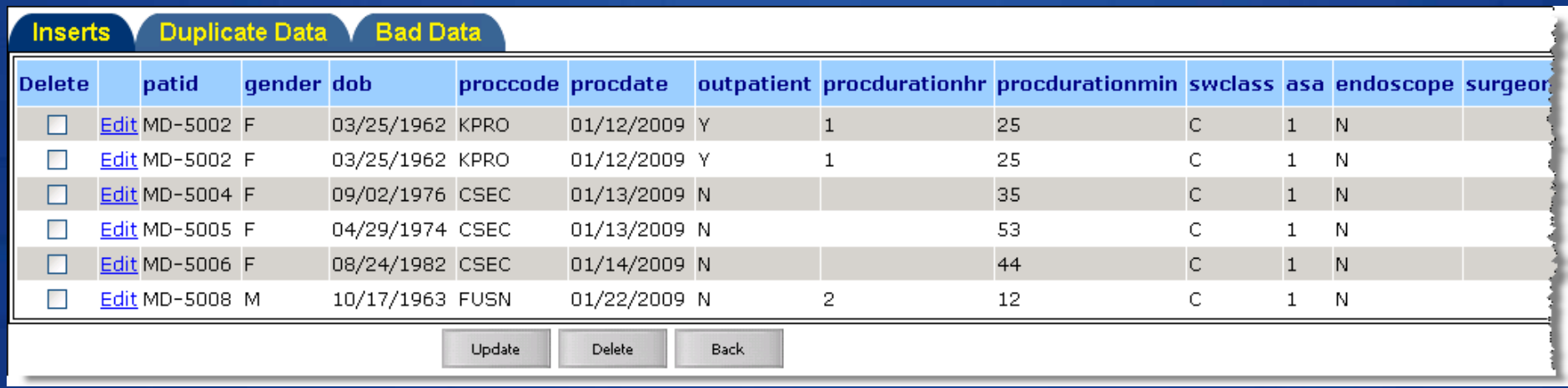
- As the file is being submitted, you will see a progress bar. Depending on the size of the file, it may take a few moments for the entire file to be submitted.

Importing Procedure Data

- Once the entire file has been submitted, you will be brought to the Procedure Import screen. The Procedure Import screen may have up to 4 tabs of procedure data: Inserts, Bad Data, Updates, Duplicate Data.

Importing Procedure Data

- **Inserts:** This tab includes all procedure records that have passed the quality acceptance checks. These records can be imported without any additional editing.



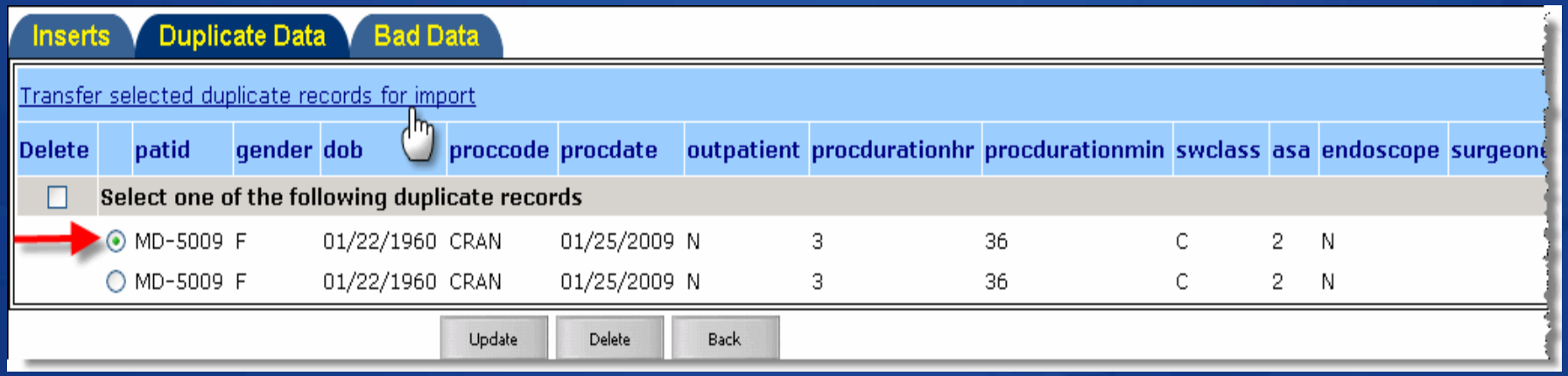
Inserts | Duplicate Data | Bad Data

Delete		patid	gender	dob	proccode	procdate	outpatient	procdurationhr	procdurationmin	swclass	asa	endoscope	surgeon
☐	Edit	MD-5002	F	03/25/1962	KPRO	01/12/2009	Y	1	25	C	1	N	
☐	Edit	MD-5002	F	03/25/1962	KPRO	01/12/2009	Y	1	25	C	1	N	
☐	Edit	MD-5004	F	09/02/1976	CSEC	01/13/2009	N		35	C	1	N	
☐	Edit	MD-5005	F	04/29/1974	CSEC	01/13/2009	N		53	C	1	N	
☐	Edit	MD-5006	F	08/24/1982	CSEC	01/14/2009	N		44	C	1	N	
☐	Edit	MD-5008	M	10/17/1963	FUSN	01/22/2009	N	2	12	C	1	N	

Update | Delete | Back

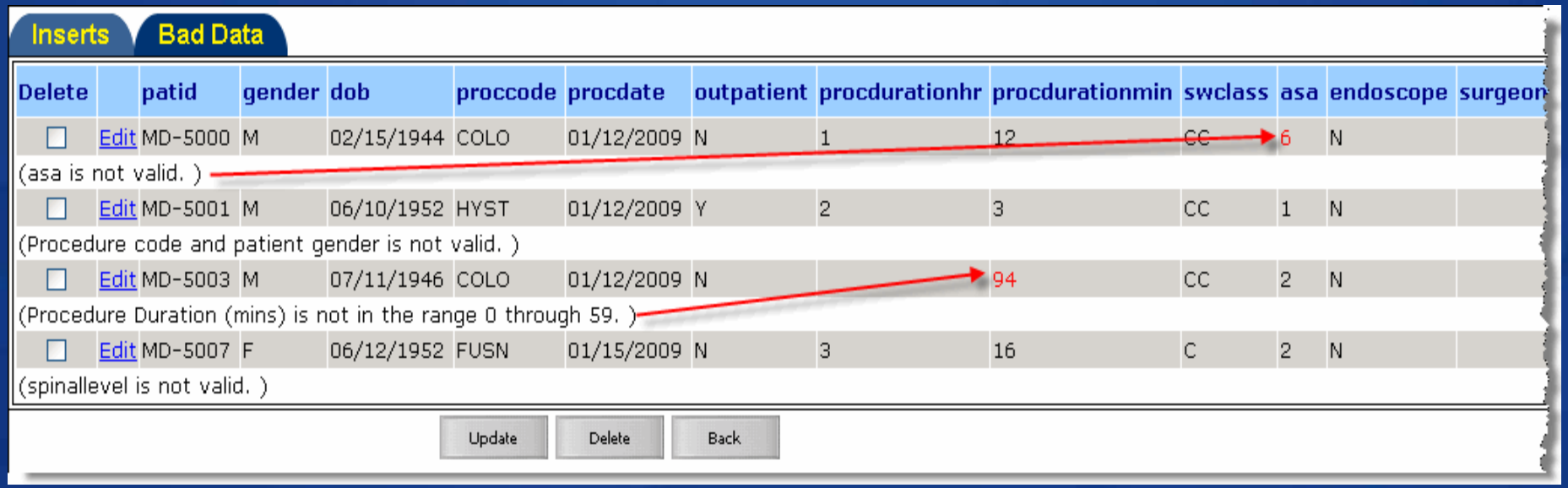
Importing Procedure Data

- **Duplicate Data:** The tab lists all procedure records in your import file that are considered duplicates. NOTE: You must either select one of the duplicate records, or delete both records from the import file before proceeding. If you select one of the duplicate records, as shown below, click "Transfer selected duplicate records for import."



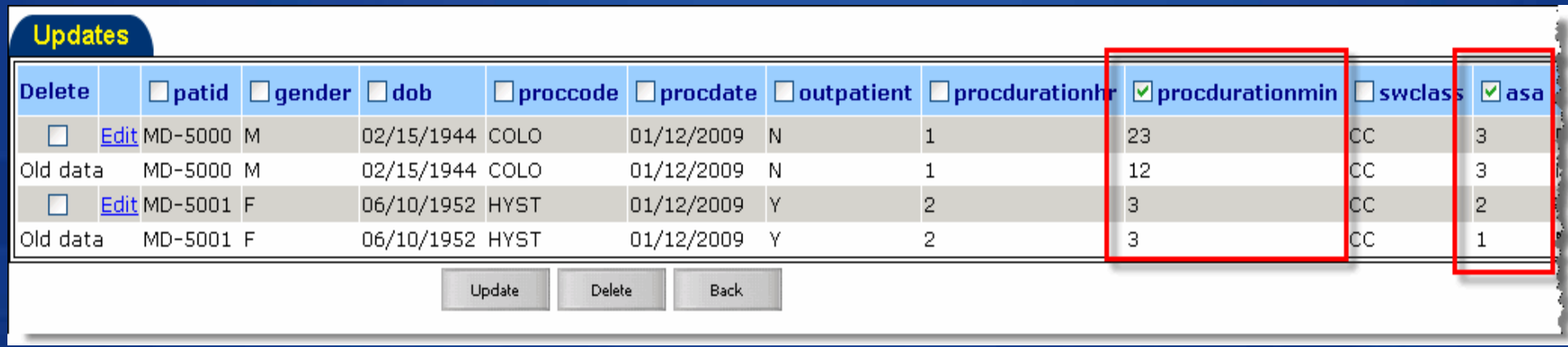
Importing Procedure Data

- **Bad Data:** This tab lists all procedure records in the import file that cannot be imported for one or more reasons. Beneath each record, details are provided that will assist you in fixing each record. NOTE: Each record in the Bad Data tab must either be fixed (click "Edit") or deleted in order to import your file.



Importing Procedure Data

- **Updates:** This tab lists all procedure records that already exist in the NHSN database, but have updates in one or more columns. You can either choose to delete the new record, or choose one or more columns to update, as shown below.



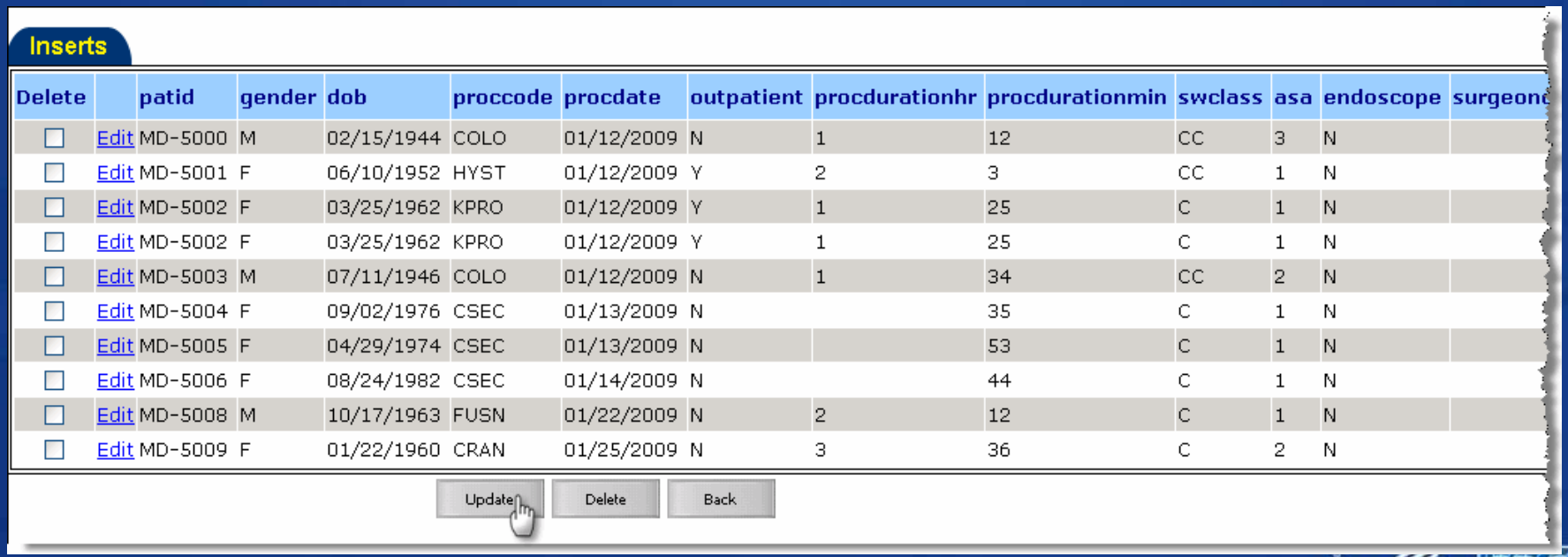
Updates

Delete		patid	gender	dob	proccode	procdate	outpatient	procdurationhr	procdurationmin	swclass	asa
☐	Edit	MD-5000	M	02/15/1944	COLO	01/12/2009	N	1	23	CC	3
Old data		MD-5000	M	02/15/1944	COLO	01/12/2009	N	1	12	CC	3
☐	Edit	MD-5001	F	06/10/1952	HYST	01/12/2009	Y	2	3	CC	2
Old data		MD-5001	F	06/10/1952	HYST	01/12/2009	Y	2	3	CC	1

Update Delete Back

Importing Procedure Data

- Once all desired edits and deletions have been made, you should have only the Inserts and/or Updates tab(s). Click "Update". When all records have been imported, you will see a message confirming the data file has been successfully imported.



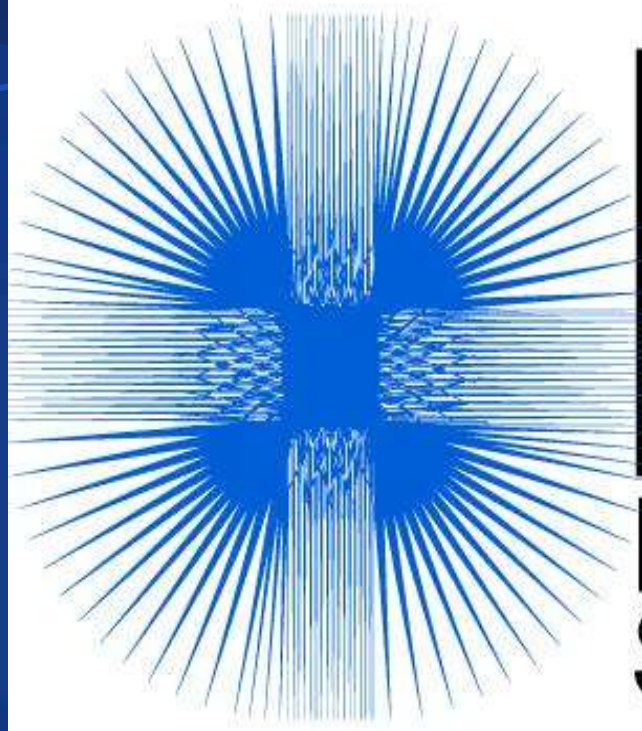
Inserts

Delete		patid	gender	dob	proccode	procdate	outpatient	procdurationhr	procdurationmin	swclass	asa	endoscope	surgeon
☐	Edit	MD-5000	M	02/15/1944	COLO	01/12/2009	N	1	12	CC	3	N	
☐	Edit	MD-5001	F	06/10/1952	HYST	01/12/2009	Y	2	3	CC	1	N	
☐	Edit	MD-5002	F	03/25/1962	KPRO	01/12/2009	Y	1	25	C	1	N	
☐	Edit	MD-5002	F	03/25/1962	KPRO	01/12/2009	Y	1	25	C	1	N	
☐	Edit	MD-5003	M	07/11/1946	COLO	01/12/2009	N	1	34	CC	2	N	
☐	Edit	MD-5004	F	09/02/1976	CSEC	01/13/2009	N		35	C	1	N	
☐	Edit	MD-5005	F	04/29/1974	CSEC	01/13/2009	N		53	C	1	N	
☐	Edit	MD-5006	F	08/24/1982	CSEC	01/14/2009	N		44	C	1	N	
☐	Edit	MD-5008	M	10/17/1963	FUSN	01/22/2009	N	2	12	C	1	N	
☐	Edit	MD-5009	F	01/22/1960	CRAN	01/25/2009	N	3	36	C	2	N	

Update Delete Back

References

- For more information about these topics, refer to the NHSN website
  - *NHSN Manual: Patient Safety Component Protocol* located at
  - ***http://www.cdc.gov/nhsn/***
    - Tables of instruction for completing all forms
    - Key terms
    - Operative procedure codes
  - NHSN data collection forms



NHSN

National Healthcare Safety Network

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